



Investigating University Science Teachers', Students' and Learning Designers' Perspectives of Mobile Learning

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Mobile devices such as mobile phones and tablets have become valuable teaching and learning tools in science education due to their accessibility and affordability. The adoption of mobile devices to support mobile learning (m-learning) has proliferated at all levels of education. Science education researchers have explored discipline-specific m-learning practices, often with a focus on approaches supporting inquiry-based learning (Liu et al., 2020) but much of this research has occurred in school contexts (Burden & Kearney, 2016). Therefore, the author conducted a Systematic Literature Review (SLR) using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Liberati et al., 2009) guidelines to investigate research trends and gaps in m-learning in university science education. Twenty-four high-quality papers published between 2011- 2021 were selected for examination using stringent criteria. The SLR focused on the research foci, methods, outcomes, study contexts and featured pedagogical approaches from these 24 studies. The SLR findings indicated that most studies adopted quantitative research methods and reported positive learning outcomes. There was an emphasis on formal settings, as well as collaborative and inquiry-based learning (IBL) pedagogical approaches. The SLR identified the following future m-learning research directions in university science education contexts: increase the number of qualitative studies; consider the views of both students and teachers; explore the adoption of m-learning approaches in more informal spaces; conduct deeper examinations of IBL and field-based pedagogies; and explore the use of networked (or connectivist) science learning approaches through social media.

The SLR findings have subsequently been used to guide a current doctoral project that investigates how mobile technologies are being used in university science education. The following research questions guide this project:

- 1: How are university science teachers using distinctive pedagogical features of mobile learning? How do learning designers (LDs) support these approaches? How do students experience these pedagogies?
2. To what extent are these digital practices perceived as pedagogically innovative by teachers, students and LDs?

Burden et al.'s (2019) innovative digital pedagogical principles, which were derived from Law et al. (2005) innovation dimensions with ICT, are used in this study. Three distinct mobile pedagogical features from the iPAC theoretical framework (Kearney et al., 2020), collaboration, authenticity and personalisation, are also adopted as a socio-cultural lens for this study. The first phase of this study is a global-scale survey for university science teachers. The second phase obtains data from Australian universities: 4 case teachers (class observations, interviews and a questionnaire); selected students from their classes (4 focus groups, a questionnaire and 8 student journals) and 4 LD interviews. Collected data are analysed in statistical software such as SPSS and NVIVO to draw meaningful interpretations.

The SLR findings, and further details on the work-in-progress doctoral-level study will be shared in this poster.

Keywords: m-learning, science education, university, systematic literature review, digital pedagogical innovation, distinctive mobile pedagogies

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